**Learning Guide Template**

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| **Unit Theme/Subject/Grade Level** | **Scientific method/Biology/10th-12th** |
| **Utah State Core Standard and Objective** | **ILO: Students will use science process and thinking skills.** |
| **Essential Question** | **What makes science unique as a way of knowing?** |
| **Learning Guide Objective** | **The student will know…**  **The steps of the scientific method**  **That science is a process of questioning, experimenting, and questioning some more.**  **That there are many ways to use the scientific method**  **The student will be able to …**  **Explain the scientific method as a process.**  **Investigate a situation using observations, inferences, and experimentation.**  **Graph and analyze results of the scientific process.**  **Leading toward the understanding of …**  **Scientific Method** |
| **Approximate Length of Time** | **1 90 min period** |
| **Connects to Prior Knowledge**  **(academic, interests, learning styles, motivation, MI, Funds of Knowledge)** | **Data gathered in pre-assessment**  **Students prefer doing hands on activities versus lectures.**  **Many students already have some exposure/understanding of the scientific method.** |
| **.Self-Starter** | **JQ: Please draw a picture of science in your notebook. (the only way you could possibly get this wrong is if you don’t try)**  **(5 min)** |
| **Frame the Learning** | **Today you are learning about…**  **Scientific Method**  **You are learning this because…**  **Science is a way of knowing and the scientific method separates true science from pseudoscience.**  **You will be doing…**  **Brainstorming, Discussing, Experimenting, Analyzing**  **You will know you have learned this when…**  **You feel confident using the scientific method to conduct investigations** |
| **Hook** | **What do you wonder about?** |
| **Phase I: Exploration and Explanation**    **(demonstrate how the instructional strategy will be used to introduce the new knowledge and skill and how it will lead the students to understanding)** | **Instructional Strategy/Strategies: (30 min)**  **Graffiti: To brainstorm pre existing concepts and to introduce our new topic.**  **Students will work in small groups at their table. They will each be given a large whiteboard and markers. They will have two minutes to write down as many things about the scientific method as they can. Each member must write at least one word.**  **After three minutes the students will pass their boards to the next table. This will continue until all boards have been to each table.**  **Board topics:**   1. **Hypothesis** 2. **Data** 3. **Conclusion** 4. **Experiment** 5. **Scientific Method** 6. **Observation** 7. **Research** 8. **Variables** 9. **Science** |
| **Phase II: Guided Practice**  **(demonstrate the opportunity the student will have to apply the use of the new knowledge and skills and lead them toward understanding while guided by teacher direction)** | **Bubble Gum Lab: (30 min)**  **Students will conduct a guided experiment to determine which pieces of gum will blow the biggest bubbles.**  **Students will then compare bubble size to stretch ability.** |
| **Phase III: Independent Practice/Assessment**  **(demonstrate the opportunity the student will have to be individually accountable for new knowledge and skills and movement toward understanding)** | **Ticket to Leave: (10 min)**  **What did you do?**  **Why did you do it?**  **What did you learn?**  **What is confusing?** |
| **Accommodations** | **Grouping strategies**  **Graphic organizers for bubble gum lab**  **Journals** |
| **Resources/Materials** | **Whiteboards**  **Markers/Erasers**  **Two different types of bubble gum**  **String**  **Meter sticks**  **Lab handouts**  **Scrap Paper** |

**Instructional Strategy used: Graffiti, Lab Activity**

**Informal Assessment used: Lab worksheet, ticket to leave**